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1906

COMMON SENSE ...VIEW... OF THE UNIVERSE

By CHAS. HEINTZ
San Pedro, Cal.

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1906

Simple and Common Sense Exposition of the Workings of Nature Throughout the Universe
and
REFUTATION OF THE THEORY of the ATMOSPHERIC PRESSURE
Supported by Visible Phenomena and Analogy

By CHAS. HEINTZ

San Pedro, Cal.

UNIV. OF CALIFORNIA

UNIV. OF CALIFORNIA

PREFACE

Having concluded that it might be better—in order to give a clearer understanding of my views about the earth's atmosphere and other atmospheres in general—to prefix to my little pamphlet on "Refutation of the Theory of Atmospheric Pressure," my personal views of the workings of matter throughout the universe. I shall call this study "Common Sense Views." They are the result of an early and ardent desire for truth, and derived from over fifty years of constant and close observation of Matter and its Phenomena.

I give these observations to the reader, only as suggestions which he may read, ponder over, and study out, and accept only such of them as his reason may approve of.

I shall not presume to teach anyone *mathematical* astronomy; for, that science has been brought to such precision, that it would take the most proficient astronomer and the best of instruments to find the least discrepancy therein.

But my object is to point out in *hypothetical* astronomy, or in the workings of matter in nature, a few misconceptions or misapprehensions, and to lead my readers to a plainer and simpler understanding of the universe and its laws. I shall adduce, as witnesses to the correctness of my allegations, a few of the scientific discoveries recently made by others, and which, I think, help to substantiate me in my own theories.

I do not claim any right of discovery in this work, for I am convinced—from evidences extant—that most of my views, especially my principal one, that of the atmosphere—were held by mankind ages ago.

As truth is eternal, though lost sight of, for a time, it is certain to be found again, when sincerely sought for.

CHAS. HEINTZ

San Pedro, California, January 1, 1906

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PREMISES

I shall base my allegations on the following premises—The correctness of which I shall endeavor to prove by experiments, or indicate by reason and analogy:

First: That Life, Matter, and Motion (or Force) are one and inseparable.

Force can not abide in nonentity.

Force must be locoated in matter, or a material body.

Second: That all Space is *literally* and *equally* filled with Matter; that every particle of matter in the universe has just room enough to exist in; that *no one* particle of matter can occupy—at one and the same time—space twice its own size; nor can *two or more* particles, of a given size, occupy—at one and the same time—the space of one particle only, of that size.

Therefore (notwithstanding the law of attractione and repulsion) there can be no pressure in the universe (under normal conditions), and, consequently, none in our atmosphere. Science has been forced to admit that ether fills all space. If ether is something, it *must* (logically) be matter.

Third: That Vacuity is impossible in nature. Not even a vacuum of the size of a pin's head will nature allow to be made. As there is no *nothing*, no vacuity can exist.

There are particles of matter so minute as to readily penetrate and pass through the pores or interstices of all concrete matter. Therefore, "How a vacuum"?

This, also, is partly admitted by science.

Fourth: That Matter is indestructible, and its divisibility infinite—as far as man's perceptions go.

All entities, from a microscopic cell to a celestial body, are concretes, agglomerations of other entities, absorbing, from their surroundings, matter for their sustenance, and radiating it back into space for the building up of other entities, and so on.

Fifth: That the terms up and down; long duration, or short duration; large or small; dense and rare, and velocity or speed, are only comparative terms; which, when taken with reference to infinity, become entirely devoid of signification.

(When I use the words *Rare* or *Dense,* I do not mean that a given space may be *more* or *less* filled with matter, but I mean that such space may be *principally* filled with smaller, or with larger particles.

Sixth: That Fire is not an entity; that what we call fire, is simply matter in great motion; that fire is a universal solvent; that all concrete matter can be dissociated, and even volatilized by fire; and, that under no known or demonstrated circumstance does fire ever build up anything—and surely not a world.

Fire, when applied to any concrete substance, acts as a repellant force among the particles thereof—as sappers and miners—tearing particle from particle, and scattering (radiating) them into surrounding space.

Seventh: That Light is not necessarily always the result of fire; for there are numerous instances before our very eyes, in which light is produced without the agency of fire.

ANALOGY

Reasoning from analogy may give us a key that will enable us to unlock and reveal as very plain and simple, the solution of many (otherwise) profound mysteries.

By reasoning from analogy, we find that *all matter in the whole universe* is subject to, and governed by, *one and the same law.* Nothing (according to its own genus) comes into existence full grown, but all entities—*without any exception*—have their beginning in embryo, pass through infancy, mature age, and procreation; attain old age, decrepitude, and disintegration (death); whether the time occupied in the evolution of this process be the millionth part of a second—as in what is called "spontaneous generation" in a flash of lightning, or a number of æons, as in the case of a celestial body, the law is the same and inflexible.

The above is the universal rule; and the universal exception is that some members of any genus may die, *prematurely,* of accident or disease. This exception, also, holds good—from a microscopic cell to a sun.

As all space is literally filled with matter, and, as no part of matter can be destroyed, I hold (and, I think, with the best of reasons) that every entity exists only at the cost and extinction of other entities; and that matter, throughout the whole universe, undergoes a perpetual change and struggle for individual existence.

THE SUN

In conformity with what I have stated above: that all entities in the known universe *must follow the same inflexible law;* that all entities have their origin in infancy (according to their own genus), grow, etc. I hold that, without the least possible doubt, the sun is the parent—and grandparent—of all the bodies in our solar system; and has itself been, in some past time, as small and imperceptible as an asteroid; and will—some day—end as a comet.

As we proceed, I shall endeavor to point out and make clear the correctness of my assertion. I am not prepared, however, to state whether the reproduction of a celestial body is agamic or bisexual (I am inclined to the former), but I am convinced that the said reproduction is generated by the magnetic elements thrown out (radiated) by *one* or *two* such spheres, meeting upon a proper nucleus—such as a meteorite.

The pollen of flowers, carried by the wind or insects; [illegible] oyster pouring upon the sands its propagating fluid, and numerous other similar cases, give us a visible example of how even sphere may be generated.

Sun and Fire

I have always doubted that the sun is a fiery mass of molten matter, with its exterior an extremely superheated body of gas: and I have also doubted that the heat we feel on this earth comes from the sun as such heat. I hold that it is the magnetic radiations from the sun meeting with the radiations from the earth, which produce accelerated motion, generation and change in the matter of our atmosphere and of the eaerth's surface, and such motion we call warmth or heat.

A very simple proof that the "fiery theory" is fallacious, consists in the fact that our highest elevations on this earth are colder than the greatest depressions; which indicates in the same simple manner—not only that the *heat* does not come from above—but, that such warmth is generated in the *lower* and *denser* strata of our atmosphere. I claim that the sun has a kernel or body like our earth; and a vapory hull (pointed out to us by the clouds above our atmosphere) composed of extremely active gases, whose luminosity is no more caused by fire, than the light emitted by the phosphorescence of the sea; by a piece of decaying wood in a warm and damp atmosphere; by a glow worm or a "fire fly."

I have seen, in the forests of tropical America, large beetles give out so much light that seeing them at some distance, I have had trouble in persuading myself that it was not the light from some window or distant fire; and I have seen them brought into close proximity to a newspaper or letter, when the light emitted by them would enable one to read by it—of course, only at a short radius.

The light of one of these beetles is beautifully green on the shoulders, and of brightest, glowing red on the abdomen. This might serve as a hint about the sun's corona. Once,, under the full conviction that someone had made a fire in the woods, I walked quite a distance to find one of these bettles upon an old stump—and, I assure you that there was neither warmth nor fire in that light. If a damp atmosphere evolves among decomposing substances, as wood, and among insects, a disposition to show phosphorescence or light, why can we not perceive that the vapory hull of a sphere may also develop self-luminous properties, and *shine,* without heat or fire?

Another startling proof that *heat* can be evolved on the surface of this earth, without coming, as such heat, from the sun, consists in the use of a magnifying glass, or sun glass, which will set combustible matter on fire, by simply focusing (concentrating) the rays of the sun. The *heat* is generated here by the convergence of the sun's rays; but does not come here, nor pass through space, as such heat.

AXIOM

Light can be produced without consuming, disintegrating fire. The sun emits light, but not heat nor fire, but is the cause of heat. Fire forms no greater part of the sun's constituents than we see in our own, or any other, moon.

And, while I am "fighting fire," I may as well state that there is not the least common sense, or physical support to the theory which tries to teach that the nebulæ are in a fiery haze, or that the sun, earth, moon or planets were ever built out of a ring, or any other shaped mass, of superheated gases.

I here insert a clipping from a newspaper, because I think it is a most potent refutation of the theory of the sun's light being fire; and it proves conclusively that some light is generated *without* fire.

PARIS, June 4.—"The celebrated chemists, M. and Mme. Currie, are suffering from an embarrassment of too much radium. The famous chemists of Paris, whose discovery of this wonderful element plnnged the scientists of the world into grave doubt as to the soundness of the atomic theory, have become the victims of this mineral Frankenstein, and, having been driven from their laboratory, are now likely to be driven from their home.

M. Currie and his wife, who had aided him in every step in his researches, are suffering from what Madame Currie characterizes as a "radium pest," Incidentally they have developed the fact that with radium in use in sufficient quantities the extortions of the gas trust would become a thing of the past, and the establishment of municipal ownership too simple to require more than the impregnation of all parts of the city with radium rays.

The laboratory of the Curries has been turned into a perpetual lighting plant by the abundant use of the metal in experiments, and even the room in which they sleep has become so thoroughly impregnated that it has become necessary to surround the bed at night with a heavy black curtain on the sides and across the top.

There is radium everywhere about the house and laboratory of the Curries, and there is but little hope of relief for many years yet to come, as they have estimated that the power of light from the impregnated walls will have diminished less than 50 per cent in forty years.

The radium follows the two chemists everywhere. There is no way of getting rid of it; no way of cleaning the place or their clothes of the mysterious light that clings to and follows them. Every piece of apparatus, every article in use about the laboratory, becomes in time a separate fountain of light, giving off the weird glow and setting up a new point of brilliance, to remain such for decades.

In discussing the strange misfortune that has overtaken her husband and herself, Mme. Currie said today:

"We will have to build another laboratory in our garden. The old one is so impregnated with radium as to render all our apparatus useless. The delicacy of all the old apparatus was destroyed by the influence of the radium, and if we put new apparatus in the radium-infested rooms it soon deteriorates.

"The finest electroscopes it is possible to buy work less accurately in a room where radium has been exposed than the clumsy article consisting of a cork, tinfoil and the mouthpiece of an old pipe. My husband and myself have found it impossible to work in a room where radium has been exposed for any length of time. The rays infest not only the room, but the whole building. It has become, in fact, a radium pest. Some of the apparatus that has been exposed, the new as well as the old, has acquired the property of throwing off radium rays, and cannot be used.

"The building will have to be torn down, for even if every particle of radium is removed, the rays will keep on increasing in intensity for two or three years, and after that, although losing in intensity, will deteriorate less than 50 per cent in fifty years."

"What would occur if you exposed an article continuously to radium for any length of time?" was asked.

"It would continue to give off rays for a hundred years at least," was the answer."

Does the above article not clearly indicate that the light of the sun does not necessarily originate in fire? and that it is not indispensable for the sun, in order to keep up the emission of its rays—like some fabulous monster—to devour its own children (the planets)? It encourages me, also, to give expression to a conviction I have long entertained: that *all matter is animate;* that this radium—like all other matter—breeds, generates, and increases its own genus, And radium has taken it upon itself to show *this* more ostensibly than other supposedly inert matter.

COMETS

The only sphere in space, *and on fire,* is a comet; which is a body that has reached its age of disintegration; fire dissociating it, and scattering through space the matter it had assimilated during its growth; it is pushed along like some huge fire rocket, on a line of least resistance, through the most rarefied spaces between other spheres; and *does not* travel in any orbit, circle, ellipse, parabola, or hyperbolic curves; and, consequently can have no periodical return. For the comet—in time—is exhausted and annihilated in space.

METEORITES

Meteorites or Aerolites are the largest, undissociated, undisintegrated particles that remain of a comet. By the law of *repulsion* and *equal distribution,* they remain scattered in space, till they happen within the reach of the attraction of the earth, or of some other sphere.

Aerolites may well contain within themselves the *germs of production,* in the same manner as the seed scattered by a dead and dried-up plant will reproduce their kind.

If I am not misinformed, the large meteorite recently brought from the polar regions by Lieut. Peary was nothing more nor less than a large magnet or lodestone, which we may plainly see possesses power of attraction, and might, under properly correlated circumstances, have become the nucleus for another sphere.

And I am entirely convinced that this is the very way in which celestial bodies are reproduced.

When one of these meteorites (unfertilized) comes within the reach of the magnetic attraction of the earth, it is drawn towards the earth, and its velocity is increased as it approaches, and attains such an amazing momentum that when it reaches our denser atmosphere, the friction becomes so great that it evolves the surprising brilliancy that we see; and, as a general rule, unless it is very large, is completely worn out, disassociated by fire, before it reaches the earth. When large, they have been seen to fall upon the earth in a red-hot mass.

Now we will go back to the comet, and tell why, after coming toward the sun—as any well-behaved thing would do—head first, and "bringing its tail behind it," it then recedes from the sun in such a shockingly ill-mannered way—tail first and head backward.

But before proceeding with this tale, I shall try to calm your fears by repeating what I have partly stated before: No comet can ever collide with any other sphere, because it has become an outlaw, chased through space by fire, on a line of least resistance, through the more rarefied spaces between other bodies, and kept at a safe distance by the power of repulsion, which, conjointly with the power of attraction, is innate in all celestial bodies and in every particle of matter throughout the universe.

Therefore, it can never approach closely enough for any danger to the sun, the earth or any other sphere.

NOW FOR A STUDY IN ANALOGY

You have all heard that the Hebrews, during their flight from Egypt, were guided during the day by a pillar of smoke, and during the night by a pillar of fire. It must have been the same pillar, but during the day they were able to see the smoke only, while at night they saw the light of the blaze on the smoke; they saw the sparks of the fire, and likely some of the blaze.

You have also seen sparks and light, and even small flames arise at night from the smoke stack of a factory, of a locomotive, or of a steamboat; but in daytime you were able to see only smoke—no flame, light or sparks seem to arise from those places by day.

The secret of this rests in the fact that the light of the sun being so much greater than the light of fire, the sparks and fire light, lying under the greater light of the sun, cannot be seen by us—if such fire is a little removed.

In the same manner, and for the same reason, only the sparks which lie in the *shadow* of the comet's nucleus are seen. A comet being a solid body, which is being burned up—undergoing dissociation, disintegration by fire, impelled through space like a huge sky rocket, scattering its sparks *all around* and in all directions, even before itself, *in its own course;* only such sparks as are in the shadow of the body of the comet can be seen—or where the fragments of rocks and sparks themselves are so thick that they cast a shadow on others—and, as the comet, in its course, changes its relative position to the sun, so does the shadow cast by the comet, upon that fiery haze around it, also change its position.

An astronomer not very far from here told me that my theory could not be correct, because the *coma* of a large comet is not straight. But I think that the refraction of our atmosphere, or the refraction (and whirl) of the entire matter in the space occupied by our solar system, may help to account for the curvature of a comet's coma.

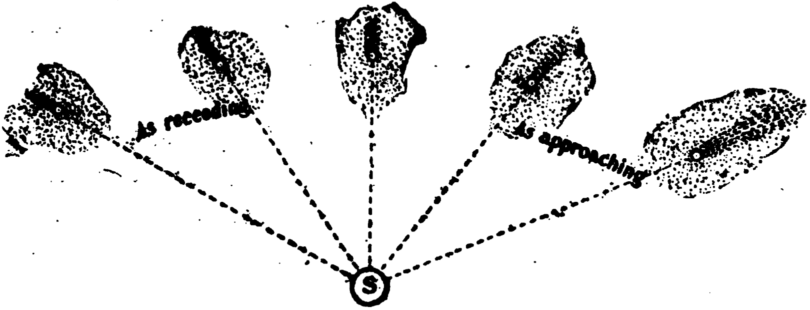
As I hold that all space is *equally* filled with matter, I think it would not be surprising, if it were found that the matter comprised within our entire solar system is in a whirling condition, caused by the rotation of the sun on its axis, and by the revolution of the planets in their orbits around the sun. Under such circumstances the coma of a large comet, may well become deflected from a straight line, and appear somewhat curved.

The *fact* that a comet was a former world—probably like our own—in some past astronomic ages; and, that it is being disintegrated by fire—need not worry this, nor the next generation of mankind; for the change to such a condition will be very gradual. It may require billions of years; and by that time there will not be a vestige of anything like man, or of anything that he now sees in his surroundings, on any such sphere.

Gradual evolution will have adapted such a body, and all it carries on its surface, to its actual conditions.

The accompanying diagram may help to illustrate, and make plain and simple, what has appeared as a profound mystery in the past.

S being the sun, you see that the Coma is always away from the sun and in the shadow of the Nucleus.



Neither nebulæ, stars, planets, nor comets can be seen by us, when the sun is between them and the earth. Th*esun's rays* being so much brighter than the light from those bodies, said rays outshine and obliterate them from our view.

VOLCANOES

Volcanies are but as *ssmall pimples* in the the earth's *cuticle.* But I'll tell you what volcanoes, oil streams and lakes, beds of coal, caves of sulphur and natural gas do indicate. They point out to us, very clearly, that a celestial body, or the earth, contains within itself the very elements required for its ultimate disintegration *by fire,* as I have, just now, represented a comet. I here give a newspaper extract on these lines.

UNIVERSITY OF CALIFORNIA, April 8.—William E. Ritter, professor of zoology at the University of California, has just returned from a voyage on the steamer Albatross, having been engaged for the last month in collecting specimens of sea life for scientific research. The entire month was passed in sounding and dredging the ocean off San Diego, although most of the work was carried on about Point Loma, La Jolla and Catalina Island. Dredging also was done about 240 miles off Point Concepcion, this being the farthest the steamer sailed from land. Here the abyssmal depths begin, the soundings ranging anywhere from 10,000 to 14,000 feet.

"It was in these great depths that we found the most interesting specimens of sea life," said Professor Ritter. "There is an abundance of life there, and it is surprising the gorgeous colors the inhabitants wear. The range of color is astonishing. The predominating life at the great depths is the starfish and the sea urchin. The sea urchin is most abundant in individuals and kinds."

Samples of the bottom were taken by the expedition at all places, and science will be interested to know that bitumen was found in large quantities at the great depths.

Pursuant to the above, I dare to ask: How could large animal entities exist at such depths, if the enormous pressure of the atmosphere, and the still greater pressure of the water were not largely, or entirely, mythical?

ONE MORE ANALOGY

It is a commonly admitted principle that the earth and planets are made (and held) to revolve around the sun, by the sun's magnetic attraction operating on them; then, if fire is a universal solvent—for, wherever we see fire in action, we find it disintegrating all concrete matter, and acting as a repellent force between the particles thereof—and, if fire will, and does, destroy the *magnetic attraction* of a magnet, and even volatilize and repel from one another the very last particles of the matter composing that magnet—provided the *heating* process is carried on long enough—does it not "overwhelmingly" prove that the sun, if on fire, *could not possess that magnetic attraction?* Which it, nevertheless, visibly possesses.

What we call fire—in my conception—is the presence of innumerable multitudes of live entities, which, like ravenous beasts, tear to pieces, disintegrate, dissociate (or, more likely, devour and change into their own kind) any concrete substance that has, within itself, the properties to attract and produce them. Their, to us, wonderfully fast movements and generation, is what we call heat. Then, why should *not* one sphere, in its general properties, be just like all other members of its own genus? A celestial body is just one member of a family, in precisely the same manner as any other individual member of any other species of entities.

It is only one simple cell in nature's economy, whether microscopic or telescopic.

Have you ever observed how *nature,* in human beings; and in animals generally; work precisely in one and the same manner: namely, the younger members remaining nearer the parent stock;

and the older increasing the distance, from time to time, till ultimately they become entirely independent of the parent? Then, why can not the sun be the parent of all the planets in our solar system; and the planets' satellites, in turn, be the offsprings of such planets? With the orbits of all gradually increasing in size, in proportion with their age.

Although the spheres of any one system are held together by magnetic attraction or centripetal force; the law of repulsion or centrifugal force gradually overcomes that of gravitation. As, in the case of our earth, I hold, it is demonstrated by the precession of the equinoxes.

(Special by Cable to New York, and by Leased Wire, the Longest in the World.)

ALEXANDRIA, Sept. 21.—Prof. Turner, Savilian professor of astronomy at Oxford, who headed the British eclipse mission to Egypt and sailed for England, September 13th, before leaving published a memoir of the results achieved by various missions.

From this it would not be surprising if the world learned soon that Prof. Hussey of the Lick Observatory has achieved the distinction with his battery telescope of discovering the much-debated new planet between Mercury and the sun.

Prof. Turner is at least sanguine of this result from a close inspection of the Lick Observatory professor's plates.

VULCAN

I shall indicate to the observer, as a corroboration of the correctness of this theory, and as a refutation of the sun's all-devouring propensities; that the smaller (younger) satellite revolves around the parent sphere on a smaller (nearer) orbit; and, that if the sun intended to devour her children, the law of repulsion, or centrifugal force would not be exerted. But the object meant for the sun's consumption, would be drawn direct to the sun, without any "roundabout way": that is, there would be no revolving around the sun, on an orbit, for, perhaps, millions of years. But, on the contrary, gravitation or centripetal force is overcome by repulsion or centrifugal force, just in proportion as they grow in size or age.

For years astronomers had suspected that there was one or more small planets revolving around the sun, within the orbit of Mercury: at last other astronomers have really located it, or one of them; and have approximately measured its orbit and time of revolution, and have named it Vulcan.

We might call Vulcan a sphere in embryo.

An Asteroid may exist, and be growing, for geologic ages, before man, with his limited instruments of vision, may be able to detect it.

MERCURY

Next, moving outward from the sun, we find Mercury.

Reason and analogy lead us to believe that Mercury had its beginning (nucleus) in a meteorite. It is the smallest and—long supposed to be the planet nearest to the sun.

It is supposed that—like our moon—it presents the same face to the sun, continually. Which may indicate that it is quite a young planet, probably not much older than our moon.

Nature operates, with regard to celestial bodies, just as it does with all other entities: the younger members are found nearer home, and gradually receding therefrom, in proportion to their growth and physical strength.

Science will not be long in ascertaining, beyond a doubt, that the orbits of planets and satellites are constantly enlarging.

VENUS

Continuing outward from the sun, we find Venus, whose orbit is very much nearer the orbit of our earth; its size is almost the size of the earth; and, judging from given astronomical data and natural phenomena, I am led to conclude that it contains about the same general characteristics as our earth: having a surface partly covered by water and an atmosphere thicker than that of Mercury, and not quite so dense as that of the earth.

Venus adds another strong link to the chain of my argument, that all celestial bodies are simply a distinct family of entities, evolved like all other entities, according to their genus.

Venus may be considered as a youthful sphere; and, since it has been given a feminine name,she may be considered to be a younger sister of the earth. She does not give one single evidence of having had her birth in fire, or of being internally filled with fire. It has been surmised, but not proven, that there is a satellite revolving around Venus. If there is one, it must yet be very small.

THE EARTH

Of the earth I have very little to say that is not commonly known.

She may be classed as an elder sister of Venus and as the youngest of the planets having one (positively known) offspring of her own, and (probably) a second not yet definitely located.

Astronomers can, without a doubt, easily ascertain the correctness of my theory, by investigating the fact that her orbit is slowly enlarging and gradually receding from the sun. I think that it has already been shown that the moon's orbit is enlarging.

There is no *logical* evidence on earth, nor any in all nature, that the earth has had its origin in fire, or that the heat we perceive on this earth, comes, as such heat, from the sun, or that the interior of the earth is a molten mass of metal. It is claimed, and, perhaps, with some *appearance* of correctness, that the heat, below the surface of the earth, increases at the rate of one degree Fahrenheit for every fifty or sixty feet of depth, and that therefore the interior of the earth must be in an almost inconceivable degree of heat.

The foregoing assertion may be correct for a limited depth, but can not be so for any great extent, or to the center of the earth.

The warmth in the flesh of our bodies, is surely not dependent upon the *fire* we have within us, or upon the proximity and radiation of a glowing-hot stove, but upon the amount and kind of food that is being digested and assimilated by us; the chosen particles thereof circulated throughout the body. It is the motion of matter (circulation) or instantaneous change, that produces what is commonly called warmth or heat in our bodies; and there is no reason why the same cause should not produce the same effect in a celestial body.

Well, I hear you ask me: "What food does the earth digest?" And I shall ask you: "What food does a plant digest?" A plant draws sustenance from the surrounding air, through its foliage, and from the moisture of the earth, through its roots. Some plants, however, subsist entirely upon the nourishment contained in the air. The earth, in the same manner, by attraction, draws sustenance from its surrounding atmosphere; and rains are the best agents to that end, while vegetation is the best agent to draw rain.

I shall now quote from a very recent and excellent book on mathematical astronomy:

The Earth's Interior

"What we know of the earth by direct observation is confined almost entirely to its surface. The greatest depth to which man has ever been able to penetrate compares with the sizes of the globe only as the skin of an apple does to the fruit itself.

"I shall first invite the reader's attention to some facts about weight, pressure, and gravity in the earth. Let us consider a cubic foot of soil forming part of the outer surface of the earth. This upper cubic foot presses upon its bottom with its own weight, perhaps one hundred and fifty pounds. The cubic foot below it weighs an equal amount, and therefore presses on its bottom with a force equal to its own weight with the weight of the other foot added to it. This continual increase of pressure goes on as we descend. Every square foot in the earth's interior sustains a pressure equal to the weight of a column of the earth a foot square extending to the surface. Not many yards below the surface this pressure will be measured in tons; at the depth of a mile it may be thirty or forty tons; at the depth of one hundred miles, thousands of tons; continually increasing to the center. Under this enormous pressure the matter composing the inner portion of the earth is compressed to the density of a metal."

The above reasoning would be quite correct—if it were not entirely erroneous; for a number of reasons: In the first place a square inch, a square foot, a square yard, a square mile, or a square, or plane, of any size or shape on the surface of the earth, *can not* reach the *center* of the earth as a *column* whose sides remain parallels; but all figures starting with a face in the plane of the earth's surface must end in a *point* at the earth's center. This diminishes that *fabulous* pressure considerably.

Second: The spherical convexity of the earth precludes any great vertical pressure towards the earth's center. I have seen people form a mound—something like a hemisphere—of wood, brush, and leaves, then cover this hemisphere with one or several layers of clay or mud; then, when this mud is baked or dried by the sun, the inside wood is set on fire and the rubbish burned out, and the resultant hemisphere of a baked-clay hull serves them as a very convenient bake-oven. But, when these people wish to use this hemisphere as such oven, they invariably have to make a fire in it, to heat the oven first; for, if they depended on the vertical pressure of that crust of clay towards the interior of the oven, to heat it, "their cake would surely remain all dough."

You may tell me that the comparison is much exaggerated—I admit—but I made it to show in a more striking manner that this *speculative* pressure and heat in the center of the earth, is *impossible* on account of the very shape of the earth. The lateral pressure would impede the vertical.

ATTRACTION AND REPULSION

That, "Every particle of matter in the universe attracts every other particle of matter with a force proportionate to its quantity of matter, and decreasing as the square of the distance increases," is only *just one-half* of the truth.

Every particle of matter does *not always attract* "every" other particle of matter. For, with the law of gravitation is equally interwoven the law of repulsion, or of equal re-distribution of matter; and the law of absorption or assimilation is interwoven with the law of excretion or radiation.

As the whole universe is *equally* filled with matter; what goes on in it, is an eternal transposition of particles, an eternal change of entities.

If, to-day a celestial body is being built—on the nucleus of a (magnetic) meteoric rock—by the accretion of particles of matter from space (principally radiations from a parent orb; it is, tomorrow, being disintegrated, and the matter thereof radiated again into space, by the little workers we call fire.

Remember that I hold that: Life, matter, and Motion or *Force*, are one and inseparable. Gravitation and Attraction seem to draw together and unite particles of matter, that, for a time, seem to have affinity for a condition we call inertia. But every particle of matter in the whole universe is in constant motion: Animal, Vegetable, and Mineral matter are subject to the same law; growth and decay; accretion and disintegration. This is what is going on in this earth. Continents, islands, mountains, hills and valleys sink; others rise. It is this constant *motion* that produces the heat, and not *pressure*.

Gravitation is limited: it is not a constant force to the center of the earth; but a particle of matter, in proportion as it is a smaller or greater agglomeration of other particles, and in proportion as those particles are closely set—homogeneous, dense, and coalescent, that they strive more or less towards the center of the arth. Therefore, I hold that the theory which claims that the center of the earth contains the heavier of substances, is correct, to a limited extent.

A particle of matter, although subject to the attraction of the earth, is not entirely drawn to the center of the earth, but said attraction stops as soon as it reaches other substances of its own gravity, or of a greater gravity or density; as, for instance, a drop of oil, falling on water, will stop on the water, but a piece of lead will go through the water. Every substance, according to its own gravity, seeks its own level or sphere.

You can not force a substance of lighter gravity, under a substance of a greater gravity, without using extraneous force. Except where lighter and heavier substances are naturally mixed—such as where ether, air, or water fill the pores of other substances. Therefore, I hold that air is in its own level or sphere and does not press on the earth with its ascribed fifteen pounds to the square inch; but, on the contrary, when you try to force air under the level of water, or of the sea—as in caissons, tunnels, diving bells, bottles, etc.—it requires, in sinking the air, a force proportionate to the quantity and depth to which you try to force said air.

Therefore no "Air Pressure," as has been supposed.

You have an object lesson, when you consider that all fluids, in a detached condition, such as drops, assume the spherical form; for the reason that a sphere is the figure which can move through space, meeting and presenting the least resistance. Then again, in a drop of water you have the evidence that all particles of matter, forming that drop, *cohere* to every other particle with which it comes in contact; and, surely, I hope that you do not suppose that the outside particles of that drop—by force of *centripetal gravity*—crush all the inside particles into a *glowing* mass; for, you can (ocularly) see that every particle of *live* matter in that drop of water moves freely among—and in harmony with—all the other particles.

A magnet and a few tacks, small nails,, or iron filings, will also reveal the same principle: that attraction is satisfied when particles of the same affinity come in contact with each other.

A swarm of bees hanging in a cluster—sometimes more than a foot in diameter—from the limb of a tree, form a compact mass; yet the *outside ones* neither crush nor tear the *inside ones* to pieces; nay, there is not a single one injured in the least!

All things are governed by the same inflexible law: a telescopic sphere as well as a microscopic one. Therefore, I hold: that no greater than this same crushing (?) centripetal (?) gravity holds good in the matter of this earth, just the same as in a "simple cell": that gravity is limited to particles of a given gravity meeting other particles of that same gravity.

I think there may be something *like* real pressure, where—because all matter in the earth is in constant motion—some parts of it, in the surface, have been elevated above the spherical level; or where cavities have been formed.

I presume that Volcanoes are the results of the friction caused by the efforts in such matter to regain a perfect spherical form, and that—under other conditions—there is no greater pressure among the particles of matter composing this terrestrial sphere, than there is among the particles of matter composing a drop of water. I think it can be easily demonstrated that magnetic attraction acts among particles of matter, only until the attracted particles come into contact with one another (into cohesion) but not with a crushing centripetal force, thereafter.

It was but a simple thing that revealed to Sir Isaac Newton the "Law of Gravitation"; it takes but a straw to *show* which way the wind blows; and, it may take but a drop of water to *show* that attraction is limited, and how it works in the earth.

Very small things may reveal *great* truths!

THE MOON

In line with my reasoning, I consider the moon as this earth's first satellite; that it has not originated in fire; that its orbit is enlarging; and, that, in conformity with conclusions recently arrived at, about the matter of the earth being in constant motion, I hold that the crater-like markings on the moon, are not the results of volcanic eruptions, but of the ceaseless motion in the matter composing the moon's mass.

When you see clouds hanging on the sides of mountains, may it not bring you to reflect that, perhaps, the corrugations, on the moon's surface, are for a prearranged purpose, such as to help it assimilate sustenance from its surroundings, through condensation and precipitation of rains, and that they are not the mouths of craters?

In support of the foregoing, I shall adduce a few quotations from a valuable text-book:

"Even with the naked eye, we can see on the moon's surface bright spots (the summits of lofty mountains, gilded by the first rays of the sun), and darker portions—low plains yet lying in comparative shadow. The telescope reveals to us a region torn and shattered by fearful though now extinct volcanic action."

"Everywhere the crust is pierced by craters whose irregular edges and rents testify to the convulsions our satellite has undergone."

'Several distinguished astronomers assert, however, that the crater Linnoeus has undergone noticeable transformations, its sides seem to have fallen in, and the interior to have become filled up, as if by a new eruption. It is said to present an appearance similar to that of the Sea of Serenity. Other marked changes are said to have been discovered from time to time on the moon's surface."

Does not the latter harmonize with my views, that all matter is in constant motion, and that satellites recede from the parent orb?

"Prof. Ball, Royal Astronomer of Ireland, claims that once the moon was nearer the earth than now," etc.

In the above, "the hook that I hang my harp on," is, that parents do not devour their children, as the sun has been reputed to do—or to be intending to do—but that satellites recede, constantly and gradually from the parent orb.

PLANETOIDS

Here follows—wrought for me by others—a mighty good link in the chain of my argument:

(Special by Leased Wire, the Longest in the World.)

BOSTON, June 1.—A letter from the Arequipa (Peru) station of the Harvard Observatory states that Eros has been photographed there by Mr. Manson with the Bruice telescope, in positions which agree closely with those given in circular No. 73, and which appear to be the first obtained since its recent conjunction with the sun.

Eros is the planteoid which approaches the earth more nearly than any other planetoid, and, in fact, more nearly than any known heavenly body excepting the moon.

I think that when astronomers have fully recognized and located it, "Eros" will be found to be another embryo moon, revolving around the earth within (inside of) the orbit of the older moon.

MARS

Passing outward we meet Mars, the first of the superior planets.

It is simply an older sister of the earth, and has two satellites of her own.

It is an orb so much like our own, that we *might* consider it as a magic lookingglass, in which we can see our earth as it will be in the *near* future—only a few millions of years from now.

(Special by Leased Wire, the Longest in the World.)

BOSTON, May 21.—A telegram has been received at the Harvard College Observatory from Professor Lowell at Flagstaff, Ariz., stating that the first winter snow appeared in the Arctic region of Mars between May 18th and 19. It covered a vast area, surrounding the old polar cap in longitude 230.

The above shows that the climatic conditions on Mars are very much like the conditions on our earth.

Her satellites and what is known of them, fortify me in my assertions: that the younger satellites are nearest the parent orb, and recede therefrom in proportion to their size and age.

I have been inclined to think that the revolutions of a satellite around its parent orb, were caused, or imparted, by the parent's rotations on its own axis; and, therefore, a revolution around the parent, should *surely* not be faster than a rotation of the parent on its own axis.

If, however, a satellite *can* and *does* revolve around the parent orb, faster than the rotations of the parent sphere, what becomes of the law of inertia of matter? Would this not also fortify me materially in my allegation: that life and motion are innate in all matter?

(Special by Leased Wire, the Longest in the World.)

NEW YORK, March 22.—Mars is inhabited. The fact is proved, according to Prof. Robert W. Prentiss, of Rutgers College, by the straight lines on the surface of the planet, which he says are fertilized areas of land instead of huge canals, as heretofore believed by astronomers. These views, which are the results of his scientific researches, he set forth in a stereopticon lecture before the board of education.

Like Prof. Prentiss, I am convinced that Mars is inhabited by intelligent and working beings; that the lines (the markings) are immense tracts of planted and cultivated forests or other vegetation: A thing we might take as an intimation to us, that we should not destroy our own forests and vegetation, but rather to *replant* where these things have been largely destroyed.

The least observation will show us that rank vegetation holds and attracts moisture, whereas the destruction of vegetation causes drought and climatic extremes. (Drying out may cause burning up.)

I hold that the sudden appearance and disappearance of those lines on Mars are caused by the dispelling or gathering of heavy clouds, exposing or hiding those lines of cultivation.

The question as to whether Mars is inhabited by beings like man, has been agitating men's minds for ages; therefore, I shall try to do a little reasoning from analogy: Science has proven long ago that plants, animals, and even men, carry *within themselves* the germs (conditions) to produce *on their own bodies*, other living entities. For instance: two plants, two animals, or two men, placed thousands of miles from each other, but surrounded by absolutely the same conditions, will evolve from within themselves, the same diseases and the same parasites.

Then, may we not be justified in surmising that every entity, *every particle of* matter in the universe—starting from the smallest particle imaginable, to a celestial body—possesses within itself, the same attributes, the same physical predisposition to evolve (under certain surrounding conditions) other living entities?

Therefore, if, in the course of time, intelligent (working) man has evolved upon this earth, why can not the same kind of being—in the long past—have evolved upon the surface of our older, and very similar, relative and neighbor, Mars?

It is in a *damp,* tropical climate that you can *readily* realize that all nature is teeming with life.

While conducting a store near the equator, I once had a number of hams hung to a beam over a counter. In a very few days I became aware that the hams were assuming a mouldy appearance. A few days later my attention was drawn to the constantly dusty appearance of that counter. I wiped it several times, yet the dust became thicker; then, upon noticing this dust closely, I could see little clusters of it move. Then I took the strongest magnifying glass that I could find—I expected to see some little live entities—but, to my utter surprise, I found myriads of little white pigs. The glass was not strong enough to reveal their little legs and tails, but I could see them run and huddle together in small clusters, just as other pigs would do, if they were so numerous.

FROM THE TEXT BOOK

"The proportion of land and water on the earth is reversed in Mars. Here every continent is an island; there every sea is a lake."

Might this not bring you to reflect that, unless the climate and surface changing (working) man on Mars, succeeds in re-establishing a moister climate on Mars, it may be overtaken by the fate—which we shall see—befell the planet that should be in the space now occupied by its debris, called "Minor Planets"?

MINOR PLANETS

From text-book, as taught in common schools:

"Discovery:—Beyond Mars there is a wide interval that was not filled, until the present century.

The bold, imaginative Kepler conjectured that there was a planet in this space. This supposition was corroborated by Titius's discovery of what has since been known as Bode's Law.—Take the numbers 0, 3, 6, 12, 24, 48, 96, 192, 384, each of which, after the second, is double the preceding. If we add 4 to each of these numbers, we form a new series: 4. 7, 10, 16, 28, 52, 100, 196, 388.

At the time this law was discovered, these numbers represented very nearly the proportionate distance from the sun, of the planets then known, taking the earth's distance as ten, except that there was a blank opposite 28. This naturally led to inquiry, and a systematic effort to solve the mystery.

On the 1st day of January, 1801, the nineteenth century was inaugurated by Piazzi's discovery of the small planet Ceres, at almost the exact distance necessary to fill the gap in Bode's series. The announcement of other new planets soon followed, until now (1885) there are two hundred and forty-seven, with a probability of more being found. Indeed Leverrier has calculated that there may be perhaps 150,000 in all.

Origin.—A conjecture that the origin of these bodies is, that they are the fragments of a large planet that in a remote antiquity was shivered to pieces by some terrible catastrophe."

I think that the above is quite correct, and helps me largely in the corroboration of my previous argument, that some members of any family, or genus, may die young of disease or accident; and that the minor planets *are* pieces of some planet that has come to a violent end. Which pieces, as I have stated above, through some magnetic influences, may (like the seeds of a plant) have started to grow into new spheres, by accretion of matter from surrounding space.

Don't be horrified, if I tell you that these same minor planets might possibly serve mankind as a warning that we should not "monkey" too much with the elements that the earth is composed of, for we have sulphur, oil, coal and gases, etc., and we might some day, like the small boy, find that "she was loaded." This is (truly and sincerely) just what I expect has happened to that older planet than Mars, which is missing from the regular space in Bode's scale.

The larger Minor Planets: Flora and Mnemosyne may be the orphan offspring of the disintegrated planet that should be occupying that space; while the others are, likely, only debris of that planet; but, which—by proper magnetic influences—are again assimilating matter from their surroundings and becoming Minor Planets.

JUPITER

Jupiter, also, falls right in line with my allegation that: the older the parent (under normal conditions) the larger the family.

BOSTON, Aug. 15.—Late tonight Harvard Observatory officials received a telegram from the Lick Observatory at Mount Hamilton, San Jose, that a seventh satellite of Jupiter has been observed. On August 8th the satellite was seen 289.07 degrees distant 54.05 minutes; on August 9th, 298.05 degrees; on the 10th, 289.04 degrees.

This satellite is a new discovery, as Jupiter was thought to have only six satellites.

A new baby world discovered in the family of Jupiter.

Jupiter seems to have successfully outlived the epoch, or age, of the climate destroying, fever giving, and world burning man, and to have escaped the fate that befell the satellite that should have been found in the space occupied by the Minor Planets.

FROM TEXT IN "STEELE'S ASTONOMY"

"Jupiter's belts are dusky streaks of varying breadths and number, lying more or less parallel to the planet's equator. The belts are not permanent, but change sometimes in the course of a few hours. Occasionally, only two or three belts are visible; at other times, a dozen narrow ones appear. It is now supposed that the planet is enveloped in dense clouds, through which light cannot penetrate; and that the globe itself is heated to a high degree, and gives off vapors."

The foregoing is entirely in conformity with my views, and is a clear object lesson, to show us how the sun is built—namely: a solid kernel with a vapory, gaseous, *self-luminous* hull. The heated part—I fear to intimate—is all from the mind.

THE VELOCITY OF LIGHT

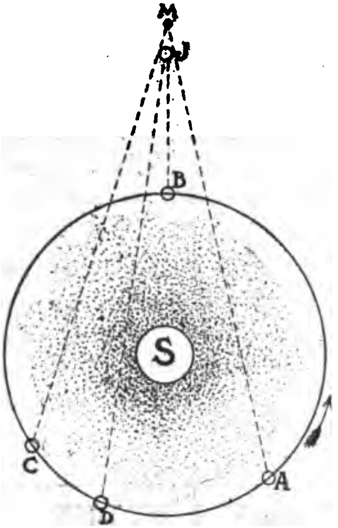
In the following we are liable to find another "hair in the butter."

"Velocity of light."—"By an attentive examination of the eclipses of Jupiter's moons, Römer (a Danish astronomer) in 1617, discovered that the motion of light is not instantaneous, as was then believed.

He noticed that the observed times of the eclipses were soemtimes earlier and sometimes later than the calculated times, according as Jupiter was nearest or farthest from the earth."

Might not this retardation in the time of the eclipses of Jupiter's moons be accounted for in some other way than to suppose that light requires a given time to traverse a given distance?

I hold that all space is *equally* filled with matter; but, I also hold that some space may be filled—not with more or less matter—but with particles *principally* larger (less permeable to light) or smaller (more permeable to light, and in more active motion). I am also led to think that the sun's dense, but gradually rarefying atmosphere may extend millions of miles into space.



Therefore, I suppose that—as indicated in figure—the difference in the time of the eclipses would be very insignificant while the earth traveled in its orbit from A to B and to C, but that the said retardation would increase faster and faster as the earth and, consequently, the line of vision were passing from C to D through the sun's gradually "thickening" atmosphere. I do not give the above as an ascertained fact, but as a well-grounded surmise, and as a problem for others to solve and verify, namely that the retardation in the transmission of light may depend more on the density or rarety of the medium through which it travels than upon distance.

Saturn, also, fortifies me in my asseverations that it is only another, elder, member of the planetary sisterhood; that it—like the earth, the moon, and Mars—has a solid kernel; that it has a denser atmosphere than Jupiter; *that its rings imply the beginning of a gaseous hull, like that of the sun,* probably of several "layers"; and evidently self-luminous, without the agency of fire. It is older than Jupiter and farther from the sun; and—in conformity with common law—has a larger family than Jupiter.

I do not think that Saturn's rings are as flat as supposed, but that what is perceived by us of the rings, are only the denser parts, while there may be vast areas, on each side, filled with a rarer gaseous substance, still quite transparent to us.

My dear readers, when reflecting about Saturn's rings, I feel *almost* as Columbus must have felt, when—after having, for years, endured the ridicule and contumely of the unbelieving masses, before he embarked at Palos, and subsequently, the threats and reproaches of his subordinates; and after having for days and nights walked on the very brink of mutiny and death—

on the night of October 11, 1492, he saw on the shore of the New World, a light which to him must have meant "Life redeemed."

So, to me, the rings of Saturn look as bright and full of hope, as that welcome light must have looked to Columbus.

Those rings furnish me with a "celestial," ostensible, and irrefutable proof that "attraction" is limited; that matter may be drawn *against* or *about* other matter without necessarily producing a (mythical) pressure of fifteen pounds to the square inch; that the atmosphere of this earth is just where the gravity, the nature, of the matter composing it, forces it to be—without pressing on the earth with a "dead weight."

Those rings surround Saturn *visibly,* without producing any Torricellian *fifteen pounds pressure* on its surface. They are detached from the orb, though held there by a limited attraction; and show to the Torricellians that matter may be attracted without pressing.

URANUS

Of Uranus there is litle to be said, that has not been said of the other, younger planets.

It is older and larger than Saturn; it revolves around the sun in its arithmetical progression; that is: it is about twice as far from Saturn, as Saturn is from Jupiter; it has four known satellites, and, very probably, a number more, too small for our observation at such a distance. It is entirely surrounded by an atmospheric hull, of perhaps two or three layers—like the sun.

NEPTUNE

Neptune ends the line of planetary descent:

It is the oldest planet we know of; it is probably enveloped, like the sun; it has but one satellite that we can see; and is, very likely, partly luminous by light evolved from its own surrounding gases, but not on fire.

Beyond Neptune there may be some still older planet—offspring of the sun—that may almost or entirely, have stopped revolving around the sun; and may have started a solar system of its own.

SECULAR ROTATION

Since I have written the above, I have received a pamphlet by Mr. Pierre Beziau, a French scientist and astronomer, who, by long, practical observation and research, has succeeded in becoming convinced, and in showing, that planets have a third regular motion; namely: that planets have—besides a diurnal rotation and a sidereal revolution—a third motion, which he calls a "Secular Rotation," a rotation, as it were, on a second axis, by which the diurnal axis of a planet, in course of time, from perpendicular, becomes horizontal to, and at right angles with, its orbit; thereby making the planes of the orbits of its satellites to run at right angles with the plane of the orbits of younger planets and of their satellites—as is the case now with the satellites of Uranus and Neptune.

He has calculated that the time of such an entire "Secular Rotation" is about 2,800,000 years. The *entire* "Secular Rotation" implies that the axis of a planet's diurnal motion, change from a penpendicular position to the plane of its orbit, to a horizontal, to a perpendicular, to a horizontal and to a perpendicular again.

This whole thing simply affirms me in the correctness of my previous intimations: that when a planet, in the course of time, gets its satellites to revolve around it, with the planes of their orbits on a tangent with the plane of its own orbit, it is becoming ready to be "side-tracked," with a purpose to start a solar system of its own, independent of the parent sun.

REFUTATION OF THE THEORY

OF THE ATMOSPHERIC PRESSURE

We will Have to Return to the Philosophy of the Ancients and Hold that "Nature Abhors a Vacuum"

And that we can make no vacuum at all; that all space must be *literally* filled with one substance or another.

Nature, in its opposition to the formation of a vacuum, evolves among fluids—when under abnormal conditions—a resisting force equal to the force heretofore attributed to the pressure of the atmosphere.

Said force I shall call Magnetic Cohesion and Adhesion.

Magnetic Cohesion and Adhesion and the Penetrability and Porosity of Matter to receive the credit for the phenomena heretofore ascribed to the pressure of the atmosphere.

I call this force Magnetic Cohesion and Adhesion, because, fluids, under abnormal conditions, develop the identical force as that of the magnet.

The whole Earth is a Magnet, as evinced by the workings af Electricity and the Magnetic Needle.

If the Moon is made to revolve around the Earth, by the earth's revolutions on its own axis, and kept, by magnetic attraction, as though held by a rubber cord, from flying off at a tangent through the action of centrifugal force;

If the Earth with its moon, and all the Planets, including far off Neptune, are all held by the same magnetic force to revolve around the Sun, may we not readily conclude that the same magnetic power is also exerted throughout the smallest atoms and particles of matter in fluids and space. Moreover! the tides on this earth palpably and forcibly demonstrate this magnetism between the sun, earth, moon and planets; and this must show that there exists a magnetic feeling throughout every particle of matter in the universe. In substantiation of this, I shall assert that the universe is literally filled with one continuous mass of matter, every infinitesimally small particle of which is in immeasurably fast motion among the other particles. And I shall further assert that, if man could make a perfect vacuum; or cause absolute vacuity in space, between this earth and the sun, in the shape of a simple plane, no thicker than a sheet of paper—or, in other words, if you could cut through space, and absolutely separate matter between this earth and the sun—as a grocer cuts a cheese in two—light would no longer reach us; the magnetic cause of warmth on this earth would no longer be felt; and, there being a gap between conductive matter, the very earth—no longer held to the sun by its magnetic attraction—would fly off at a tangent, through space because of the former centrifugal force, or impetus, given it by its revolution around the sun.

As the whole universe is literally filled with matter—you may call it ether or by any other name—every cubic inch of space contains the same amount of matter, whether taken in the earth, as dense as gold, with its atoms cohesive, closely set, and almost homogeneous; or taken midway between here and the sun, with particles rarefied, loose, and heterogeneous as ether.

NEW SUN SPOTS.

("Scientific American," March 11th, 1905.)

"Another group of sun spots has appeared on the eastern meridian. They cover an area of possibly 3,000,000,000 square miles, and are more active than the great spots which appeared last month, and which are breaking up and disappearing beyond the central meridian.

These new spots are likely to cause disturbances of some importance in the atmospheric conditions later, but it is too early to predict positively as to that."

If, from the above circumstance, we need fear, or hope for, some physical results to our earth, does this not prove an absolute continuity of conductive matter from here to the sun and throughout infinity of space? And, in this space our earth is but "a simple cell" or as a speck of dust. Where does the air pressure to our sphere come from?

Every molecule, atom, speck or particle of matter in the universe has just space enough to exist in; and, no one atom can, at one and the same time, be made to occupy the space of two or more atoms of its own size; nor can two or more atoms of the same size be made, at one and the same time, to occupy the space of one atom only, of that size. But all atoms, under normal conditions, move about freely among themselves, and seek their own level without hindrance.

For the above reasons, I hold that a vacuum can be made only in theory, but not in practice; that, on the surface of the earth there is no atmospheric pressure, except under abnormal conditions; that through mechanical appliances (theoretically) the air can be compressed and expanded. And, since every particle of matter has space enough to exist in, there can be no pressure in the universe, except under abnormal conditions.

Nothing is ever created, and nothing can be destroyed; matter can not be increased nor diminished; but there is, throughout the universe, an unceasing change of entities. No single entity exists, except at the expense of numerous other entities. There is no ultimate—indivisible—atom; the divisibility of matter is infinite, as far as human physical perception goes.

When we say that a thing (the matter within the barometer, for instance) has expanded, we can not mean that a certain portion of matter has, of itself, increased its dimensions, but that its apparent size has been increased by the absorption (within the visible part of itself) of other matter not perceived by us, with our physical optics.

Since some phenomena can, now, be perceived by the mind only; and as a great deal, unexpected, has been revealed to us lately we may hope that science may continue to reveal to us some more of nature's intricate phenomena.

PRESSURE THEORY

The theorists of the atmospheric pressure have figured out—to a nicety—that an ordinary mortal is doomed to walk through life, carrying about with him a full freight car load, i. e., sixteen tons or thirty-two thousand pounds of atmospheric pressure, of the existence of which, however, he—poor mortal—luckily, never becomes aware.

Because, say the theorists, the air presses downward, upward, frontward, backward, rightward, leftward, inward, outward and every other possible 'ward; till the theory becomes as thin and attenuated as the most rarefied air, or the "so-called" ether itself; as evanescent as the morning dew, and, as materialistic as a hobgoblin, a banshee, or a spook—it presses so hard that you can blow it away (visibly) with a whiff of cigar smoke.

And the "bloomin'" pressure becomes no pressure at all.

Of course, as nature does not permit a vacuum; wherever an object is taken out of a given space, air simultaneously follows, in any direction, to fill said space, but without the mythical air pressure.

If the above theory were correct, we might be living amidst surroundings as breezy as thick curd under a cheese press—and far worse.

FIRST MISTAKE

ORIGIN OF THE FALLACY

Historical Sketch

The following occurrence, given in this historical sketch, is responsible for having misled science for two hundred and sixty-five years (1905):

> "In 1640, some workmen were employed by the Duke of Tuscany to dig a deep well near Florence. They found to their surprise that the water would not rise in the pump as high as the lower valve. More disgusted with nature than nature was with the vacuum in their pump, they applied to Galileo. The aged philosopher answered—half in jest, we hope, certainly he was half in earnest—'Nature does not abhor a vacuum beyond 34 feet.' His pupil, Torricelli, however, discovered the secret. He reasoned that there is a force which holds up the water, and as mercury is 13½ times as heavy as water, it would sustain a column of that liquid

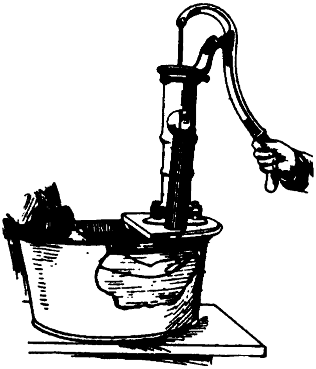
only 33 feet divided by 13½, equal to 30 inches high. Trying the experiment he verified the conclusion that the weight of the air is the unknown force. But the opinion was not generally received."

And it would have been well for science and mankind generally if his error had never been stamped as correct. If he had found the "unknown force" to have been magnetic cohesion; mankind might have been led into a clearer stream of reasoning.

The 34 feet for water, and the 30 inches for mercury, do not represent the force with which the air PRESSES those columns of water or mercury *up* in the pipe or tube, but they measure the cohesive force of these two fluids.

Demonstrations to Prove the Fallacy of Torricilli's Theory of the Pressure of the Air

Take a small, ordinary "suction" pump, fasten it to a small wash tub, so that the mouth, or bottom of the pipe, will be submerged, two or three inches only, below the surface of the water; work the handle, and you will first exhaust the air in the pipe and cylinder, then the water will rise—not by the pressure of the atmosphere on the surface of the water in the tub—but by "suction" or magnetic cohesion, which *pulls* the water up; and, if you place your hand under the end of the pipe in the water, you will feel your hand drawn up and forcibly held there by an *inner pull,* as though hand, cylinder, piston and all had become one solid mass. The piston and handle are obstructed from working, because held fast by the *cohesive* and *adhesive* force of the water in the pump—*not* by an outside *push* or *pressure* of the air.



If the pressure of the air were pushing the water up the pipe, the piston of the pump would keep going right up—with no greater exertion than before you interposed your hand and stopped the inflow; but it does not, for it is held fast by the cohesion and adhesion of the water in the pump, as though all had become one solid mass, and the handle comes down only as air or water permeates into the pump through the loose working of the piston and the porosity of the iron, or the withdrawal of the hand.

If you throw the water out of the tub and try the pump as an air pump, you will derive the same results; i. e., your hand will be *pulled* to the mouth of the pipe and forcibly held there by the cohesive force of the air *inside* of the pump, and not by the pressure of the air *outside* in the tub.

Other Proofs

Take small glass test tubes, of a size adapted to the purpose—if closed at one end—put the open end to your mouth; extract (suck out) as much of the air as you can; let the point of your tongue go into the opening of the tube, and you will find the tube attached to your tongue; and you will plainly feel your tongue *pulled* into the opening of the tube, by the *cohesive* force *within,* and not *pushed* in by the *pressure* of the air *without.*

If the tube is open at both ends, place your finger to the lower end of the tube, to stop the inflow of air from that end; proceed as before, and you will feel both finger and tongue *pulled* toward each other by the same *inner* cohesive and adhesive power, and not by air pressure from *without.*

Any lady or child can try the same experiment with a thimble, a little glass vial, or any other small trinket, and they will obtain the same results; i. e., they will feel their tongues *pulled* in, and not *pushed in.*

About Penetrability and Porosity of Matter

It is beyond the skill of man to construct any vessel or receptacle whose constituent atoms are so closely set (so coalescent) as to entirely prevent the penetration or escape of very rarefied atoms of matter through its pores; as shown by the pressing of water through the pores of a brass cannon; the exudation of essential oils through the pores of glass; of ordinary kerosene through the pores of an iron tank; the penetration and escape of heat and radium through any kind of matter; and the running of electricity through the pores of a wire, at the rate of thousands of miles per minute.

We Find in the Text Book

"UNDULATORY THEORY OF LIGHT."

> "There is supposed to be a fluid, termed ether, constituting a kind of universal atmosphere, diffused through space. It is so subtle that it glides among molecules of bodies as the air does among the branches and foliage of trees. It fills the pores of all substances, eludes all chemical tests, passes in and through the receiver, and remains even in the vacuum of an air pump."

How about this for the chances of a vacuum?

SECOND MISTAKE

THE "TORRICELLI BAROMETER"

Following up his air pressure theory of the pump, wherein he alleged that the pressure of the air on the surface of the water in the well, pushed up and held up, in the pipe of the pump, a column of water thirty-four feet high—never thinking that there could be driven-wells, or pumps, that have no open surface of water for the air to press on, Torricelli claimed that the same air pressure on the surface of the mercury in his cup, held up in the tube, a column of mercury thirty inches high. Experiments and observations will prove the same cohesive power holds up the mercury in the tube.

Fill tube with mercury, leaving top of mercury level with the mouth of tube; pour two or three inches of mercury into the cup; place index finger of left hand strongly on top of mercury tube, so that you may be able to reverse the tube without allowing any of the mercury to come out of the tube; notice the condition of the tube. when so reversed, and you will see that the tube is still literally filled to the top: that is, without the least perceptible air bubble in it, while the finger supports the weight of the mercury in the tube. Now, submerge mouth of tube—with finger still closing it tightly—into the cup of mercury, until mouth of tube may be one inch or more below the surface of mercury in the cup; remove the finger from mouth of tube—being very careful not to allow the mouth of tube to come near or above the surface of mercury, that no air may enter into the tube from above the surface. Yet, an air bubble six to nine inches long, results in the top of the tube, after finger is removed.

How did the air enter the tube?

By the pressure of the air outside? No! The finger which supports the weight of the mercury in the tube, being removed, some of the mercury—by its own gravity—falls out of the tube into the mercury cup, and *pulls* air into the tube, through the tube's pores, until the mercury has reached an equilibrium or level between its own cohesion, the cohesion of the air pulled in, and its own gravity.

If you hold the tube perpendicularly, when you remove the finger from the bottom of the tube the air bubble at the top forms itself in an invisible, mysterious manner, going up through the center of the mercury; but if you incline the tube a few degrees, you can see small air bubbles forming on the whole length of the tube, and going up on the upper side—"on the line of least resistance"—as they had (when the tube was perpendicular) gone up through the center, invisibly.

If, with the mouth of the tube still under the surface of the mercury in the cup, you give the tube an inclination of forty-five degrees—thereby diminishing the weight or gravity of the mercury in the tube—the mercury from the cup will re-ascend, refill the tube, allowing the air—which had previously been pulled in—to escape through the pores, just as readily as it had entered.

Which proves the force and promptness with which nature works to re-establish normal conditions in matter throughout space. In the name of common sense! How can the pressure of the air affect the mercury in an hermetically closed thermometer tube? By the flexibility of the glass? Why not say through porosity, and the penetration and recession of *matter* (heat) through the pores of the glass?

Do physicians place thermometers into the mouth, or under the arms of patients, to ascertain the condition of the *atmospheric pressure* there, or to discover the thermal condition of the patient? Then it is heat that expands the mercury, and not the decrease of air pressure. What is the difference between the mercury in the barometer and thermometer?

❧

THIRD MISTAKE

Otto Von Guerricke's Water Thermometer-Barometer

Otto von Guerricke, in substantiation of Torricelli's "Pressure of the Air" theory, constructed a "Water Barometer or Thermometer," consisting of a very high tube—perhaps thirty or forty feet high, filled with water—the top of the tube protruding through (or reaching above the bottom sill of) some window, or opening in the roof of the house. On the surface of the water in this tube, he placed some little wooden, pith, or cork figure, which he may have called a weather prophet; for, in warm and fair weather the figure would rise—perhaps a few inches—and appear to be looking out and taking an airing through the said window or opening in the roof; and, in cold or cloudy weather, the figure would fall below said opening, and would appear to be hiding from the inclemency of the weather. This smartness in Otto Von Guerricke came near costing him his life. Because Otto's pious neighbors thought him possessed of diabolical (supernatural) knowledge, altogether too much for any ordinary mortal.

Guerricke thereby proved (to his own satisfaction) that in "heavy" cold weather, the atmosphere pressed so hard on the "top" surface of the water in his tube that the figure was lowered out of sight, and that in "light" fair weather the air pressed less and allowed his little figure to have a look out of doors. He never perceived that the whole phenomenon consists in the contraction and expansion of the water in the tube, through the penetration and recession; the presence or absence of minute particles of matter in the air, which we may call ether, heat, radium, or any other name, provided it is matter, so minute, as to be able to readily enter or leave the water, through the pores of the glass; thereby expanding or contracting the apparent bulk of the water, raising and lowering the little figure in the upper part of his tube. Not by the pressure of the air on the top surface of the water, but by the penetration and recession of said particles of matter.

Railroad Superintendents—to their sorrow and cost—know something about the contraction and expansion of rails, in hot and cold weather. Especially along an incline.

Bear in mind, the great difficulties that have been encountered in trying to establish a standard of linear measure that would not contract or expand. Is this expansion and contraction due to atmospheric pressure?

I have before me a little toy called a "bottle imp." It is made of glass, and is hollow; it has an almost imperceptible hole at the end of his finger, so small that water would not pass through it of its own volition.

Therefore, in order to fill the figure with just enough water to make it very near equal in gravity with the water into which it is immersed in the glass test tube, it is necessary to heat the air within the little figure (thereby, *matter,* called heat, entering inside; occupying some of the space previously occupied by the normal air, and "expanding it,") then, quickly immersing the figure into cold water, makes the *matter* called heat instantly radiate into the surrounding cold water, which leaves an unoccupied space in the figure (and would be a partial vacuum (if nature could permit it), then the magnetic cohesion of the *matter* (air) inside pulls in as much of the water surrounding it, as the *matter* called heat previously occupied space within; and this process is repeated until the combined gravity of the figure (almost) equals the gravity of the water in which it is immersed.

This little toy will also help to prove that gravity does not invariably tend towards the center of the earth; but that gravitation is gradual, and only in proportion to the excess of density in the object attracted, over the density of the fluid in which it is immersed—for we can hold the imp in any depth of the water in the tube, at our pleasure.

All barometers or thermometers—no matter how constructed—are influenced by the same principle; namely, by extraneous matter penetrating into, or escaping out of the instruments; and not by pressure of the atmosphere from without.

FOURTH MISTAKE

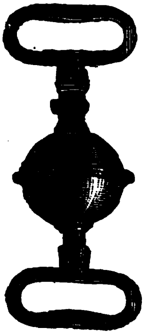
Otto Von Guerricke's "Magdeburg Hemispheres"

Otto Von Guerricke, in order to accentuate the theory of the atmospheric pressure, invented the air pump—for which invention we would give Mr. Guerricke the greatest praise, if he had not generally misunderstood the nature of the phenomena evolved by its use.

After the pump he invented the "Magdeburg Hemispheres."

Guerricke's greatest achievement, and most misleading, and most glaring error.

There is nowhere in the text-books on Pneumatics, and I could not think of, nor invent, an experiment that would more palpably demonstrate the gross fallacy of the theory of the air pressure, than these hemispheres.



Attach the hemispheres to the air pump; extract (?) all the air that you can from the hemispheres; that is, draw the two hemispheres so closely together—by the magnetic cohesion and adhesion evolved—that two strong men cannot pull them apart—yet you may tie a string to them and give them to a child to play with, and he can swing them in *every direction,* without any greater exertion than if the air had not been exhausted. You may push or pull them in every possible direction just the same as if they were full of normal air; you can in no possible manner become aware of any external pressure of the air; but, when you undertake to pull them apart, a great force is required. Since we can in no palpable or rational way detect this force outside, we must look for it inside, and it becomes glaringly evident that the resisting force is magnetic cohesion and adhesion evolved by the abnormal condition created *inside* the sphere.

When we think we have extracted the air from within, we have extracted only the coarser part of the air (the larger particles —those having the greater gravity or affinity towards the earth); but the sphere is still filled with rare atoms which have readily filtered inward through the pores of the metal.

This shows the force with which nature resists the creation of abnormal conditions throughout matter in space, and the formation of a vacuum.

Proof: If the sphere, after having evinced such remarkable resisting force, is left to stand unmolested for a time—according to size of sphere and porosity of the metal from which it is composed—the two hemispheres will fall apart of their own gravity; the air inside having again attained a normal condition through the inward filtration of molecules from the outside.

A Frightful Spook

I was just told that the most infallible proof of the existence of the pressure of the air is obtained by placing the above described Magdeburg Hemispheres—with "air exhausted" to a resisting force of two or three hundred pounds—under the receiver of an air pump; exhausting the air from the receiver to the same rarity as the air in the inclosed sphere; thereby having removed the "pressure of the air" from between the inside surface of the receiver and the outside of the sphere, the hemispheres will fall apart of their own gravity.

I will admit that this experiment is extremely delusory. I will also admit that, when our mind has been *seeded* with the *spook* of the *atmospheric pressure,* the above experiment tends to make us see *ghosts* quite clearly.

But, when we can see and conceive the force to be magnetic; when we can relegate to oblivion the phantom air pressure, which can be materialized—like all other spooks—only in darkness and misapprehension, we can realize that the air in the hemispheres having been rarefied to such a degree that every point on the inner surface of the hemispheres, pulls toward every opposite point of the inner surface with such force that the aggregate resistance may equal two or three hundred pounds. Then, if we place the said Magdeburg Hemispheres—so rarefied—under the receiver of an air pump, and, in the same manner, rarefy the air between the outer surface of the hemispheres and the inner surface of the receiver, to the same degree as the air in the hemispheres; the hemispheres will fall apart as above—of their own gravity. We having created the same abnormal (the same magnetic) conditions within the entire cavity of the receiver, including the cavity within the sphere; we have, seemingly, neutralized the tenacity of the atoms within the sphere; and every point within the inner surface of the receiver is now magnetically pulled toward every opposite point on the inner surface of the receiver, just as the air in the hemispheres alone was previously pulled.

Is it *air pressure* that forces the armature and magnet together? ? ?

The Hollow Sphere under the Receiver

This experiment seems to have helped materially in misleading science from the true conception of the air or atmosphere.

Air is as material as any other substance, but, its affinity (gravity) towards the earth, is limited: the lower strata of the air barely coming into contact with the surface of the earth.

In this experiment, a hollow metallic sphere is filled with normal air and balanced on a scale beam, then placed under the receiver of an air pump, and the air exhausted (?) at the bottom of the receiver.

As air is a mixture of substances of different gravity, that part of the air, having the greater gravity, is drawn from the bottom of the receiver—the receiver, nevertheless, is just as full of matter as it was before; for, finer, sifted air or ether, went in through the pores of the glass, as fast as the pump drew the coarser air from the receiver; but the sphere still contains such of the coarser air as could not be drawn through the pores of the metal. The sphere, now, being surrounded only by the rarer air in the receiver, very naturally sinks, and seems to indicate that air has weight; but it simply shows that the coarse air in the sphere has more affinity towards the surface of the earth, than the finer air in the receiver.

If the sphere is attached to the air pump and the air is exhausted from it, then closed and detached from the pump; upon opening the stop-cock the air rushes in with a hissing sound—not because of the pressure of the air from *outside,* but because of the magnetic attraction from *inside.*

Stop the inflow with your finger, and you can *feel* whether the force is exerted *inside* or *outside.*

I think that the mouth of that stop-cock could be so constructed that a sufficient part of the finger might be *drawn* in by the *tension* of the air *inside* of the globe, that the globe itself then might be suspended from the end of the finger—and held there by the *suction* of the air inside, and not by the pressure of the air outside.

Rubber Bag or Bladder

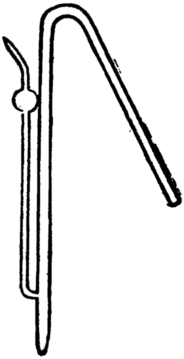
The Rubber Bag or Bladder experiment, illustrates the above phenomenon in the same manner: that is, place bag or bladder, inflated, under receiver, exhaust air from receiver, and the bag or bladder will further inflate, sometimes unto bursting; not because they have been relieved of the pressure of the air between the inside surface of receiver and the outside surface of bladder or bag; but because the air in either bladder or bag comes under the same abnormal condition as that in the receiver, and the same magnetic force or cohesion has been participated to the air inside of bladder as that outside in the receiver. Rarefied air from in the receiver entering the bladder and expanding the coarser air within; in an endeavor to have rarefied and coarser matter more equally distributed; approximating more nearly a normal condition.

Pressure of the Atmosphere

If you were able to make an absolute vacuum of the size of the space comprised within our whole solar system: that is, as large as a sphere whose circumference would be of the magnitude of the orbit of Neptune—our earth being outside of that vacuum—and that you could crowd that matter exhausted from that space, into space outside; the abnormal condition thereby created in infinity of space, would still not amount to a pressure of one grain to the square mile of our atmosphere.

THE SIPHON MISTAKE

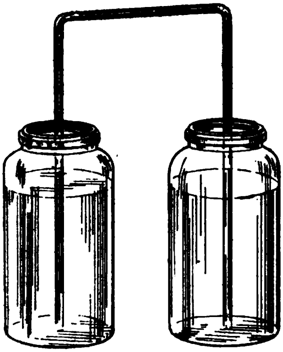
The workings of the siphon is another misapprehension of the nature of fluids. No matter of what, or in what shape, a siphon may be constructed, it will not work, unless the arm from which the liquid runs *down,* contains more liquid than the arm in which it is lifted *up.* That is: the liquid descending must have more gravity or weight, than that ascending. The water must flow out of the siphon at a lower level than where it is pulled in. The greater weight—through cohesion in the fluid—*pulls up* the lighter weight in the other arm.



Atmospheric pressure has nothing to do with it, and does not exist.

Siphon or Equal Arms

Take two wide-mouthed glass jars, of about one gallon capacity; fill them nearly full of water. Take a bent glass tube with arms of equal length; fill the tube with water, so that both arms are entirely filled even with the mouths of the tube; place a finger of each hand on each opening of the tube, in such a manner as to impede any water coming out of the tube, upon inverting it. Invert the tube and place one opening of the tube into the mouth of each jar; taking great care not to let any of the water escape from the tube during this operation. If this has been properly done, the inverted tube will be entirely full of water. Now, tilt both jars so as to pour out about one-third of the water from each jar. Raise one jar three or four inches, thereby bringing the surface of the water in that jar so much above the surface of the



water in the other; and you will find the water from the higher surface, running into the jar of the lower surface, until the surface in both jars is alike.

Now, raise the surface of the water in the other jar, above the surface of the first, and the water will run back into the lower jar. You can alternate this operation as long as you please. If the area of the surface of the water in both jars is equal.

Where does the atmospheric pressure come in?

All matter seeks its own level according to its own nature or gravity. All particles of matter move freely among other particles of their own kind; and when a particle of matter has reached the level of its own kind, gravitation ceases for that particle.

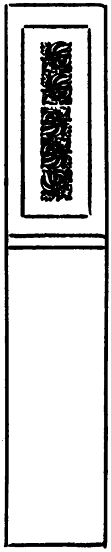
The water in the side of the tube that contains the most water —by cohesion and gravity—pulls up the water in the lighter side. And I think that the same rule would prevail if the arms were thirty feet high. *Cohesion* and *gravity,* not *pressure,* operate in this case.

From Scientific American

(9565) E. M. H. asks: An empty 10-gallon metal air tank weighs 10 pounds. How much dead weight will be required to sink it in fresh water? Charge the same tank with 100 pounds of air, would it hold up more weight than if not charged? Could you pump the air out of that tank so that it would sink of its own weight? A. A tank of 10 gallons capacity will hold about 1 1-3 cubic feet, and when this is sunk in fresh water it will be buoyed up by a force equal to the weight of 1 1-3 cubic feet of water. This is very nearly 83 1-3 pounds. Since the tank weighs 10 pounds, an addition of 73 1-3 pounds in the tank will sink it. If 100 pounds of air are pumped into the tank, it will sink the same as if 100 pounds of lead were put into the tank. We have now 110 pounds total weight of tank and air, and 83 1-3 pounds buoyant force of water. The difference, or 26 2-3 pounds, will be the force with which it will sink. Pumping air out of the tank will make it lighter, and so it will float better. You cannot make a thing sink by pumping air out of it. Air weighs under ordinary pressure about 1¼ ounces per cubic foot, and 1 1-3 cubic feet will weigh 1 2-3 ounces. The tank will weigh 1 2-3 ounces less when the air is pumped out of it than it did when full of air. You cannot pump 100 pounds of air into such a tank. The pressure would be about 9000 pounds per square inch, and no tank of this size and weight could witstand any such pressure.

If Torricelli's atmosphere pressed, at the rate of 15 pounds to the square inch, on the surface of the water in his well; where is that pressure now? that it can not be found to press this ten-gallon can under water? when it only requires—according to the Torricellian theory—83 1-3 pounds to sink it? though it has a surface of 190 square inches, making a total pressure of 2,850 pounds on the tank?

Oh, yes! I had forgotten! It presses upward, too! It is a most accommodating pressure; it presses in any *one* particular direction, when so required by our sophistry; but, under other circumstances it presses in every direction, until it presses nowhere. Does not the above experiment clearly prove that air does not press on the water, but rather struggles upward?



Fountain in Vacuum, or Guinea and Feather Tube

The pressure theory is: that, if you exhaust the air out of this tube, and place it in such a manner that the stop cock would be submerged in water; and, that upon opening the cock, the water, through atmospheric pressure, would rush in with such a force as to almost strike the upper end of the tube.

The phenomenon is well described, but the force is incorrectly ascribed. Namely, the inner strain *pulls* the water in; and atmospheric pressure does not *push* it in.

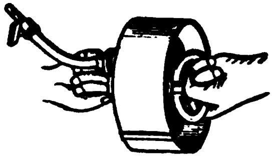
Take the above tube, fill it about nine-tenths with water, attach it, inverted, by rubber tubing to the air pump; extract the air from top, and you will discover—when the inside has been brought to a strong tension—a mist of little air bubbles going up throughout the water.

Does this prove air pressure? No! But it proves the porosity of the glass and the inner elastic tension of the fluids, which, through magnetic cohesion, *pull* some of the more rarefied atoms of the air from *without* into the water and into the air space *within*.

This phenomenon is not the result of a pressure *without*, but of the abnormal condition *within; drawing* the air *inward*.

The Spirometer

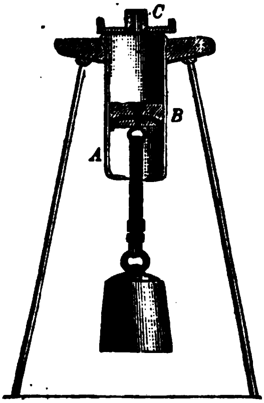
The Spirometer is another apparatus used to illustrate the pressure of the air. But it also plainly shows the inner magnetic cohesion *pulling in* the piston, as the air is being exhausted by the pump; and, not that it is being *pushed* in, by air pressure from outside.



By pushing and pulling on this apparatus, one can plainly feel the elasticity of the air within; and one is impressed with a sense as though the cavity were filled as with soft rubber adhering to the inner surfaces.

Upward Pressure Apparatus

This apparatus used to demonstrate the enormous upward force of the atmospheric pressure, is only another, and still more palpable, proof of the fallacy of the above theory.



This instrument is capable of lifting a large weight by the contraction and exhaustion of the air from within; but, under its greatest contraction and lifting force, you can not become aware of one grain of atmospheric pressure from *without*. Therefore, it most clearly proves the magnetic cohesive and adhesive force *within*.

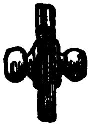
The Tumbler of Water Experiment

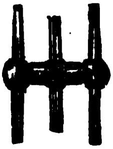
The tumbler filled with water, and covered with a paper, and turned upside down, is subject to just the same law as the above experiment. The *cohesion* in the water, and the *adhesion* of it, to the glass and paper, prevent air from penetrating upward, as long as the paper remains in good contact with every point of the tumbler's (upper edge) circumference.

The water can only come out when air finds means of entering and filling the upper space in the tumbler. The weight of the water in the tumbler is not sufficient to pull air in, through the pores of the glass. Cohesion and adhesion of the water in the tumbler, and the law that all space must be filled with one substance or another, are the laws that prevail in this case.

The weight (gravity) of the water in the tumbler is supported by the hand that holds the tumbler, and not by the upward pressure of the air under the paper. Arrange a tumbler so that you can hang it *inverted* from some weighing scales—when so filled—and you will find that its gravity is just the same whether the air presses (?) on it up or down.

Cohesion Plates





I have before me a pair of (four-inch in diameter) brass, "Cohesion" plates. You wet, with water, the inner surface of each of these plates; press them together, and rub them a little to press out all the superfluous water from between them. If properly worked, two strong persons can not pull them apart in a straight direction, or in a line at right angles with the surface of said plates; but they will readily part, if slipped sideways. Now, why is this cohesion? When the Magdeburg hemispheres and all other apparatus heretofore mentioned are supposed to be operated on by atmospheric pressure?

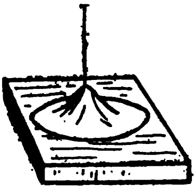
They are emphatically the same in result, and are acted on (I say) by the same magnetic cohesion and adhesion only. As every point on the inner surface of each of these plates—in the attempt to pull them apart—is acted on simultaneously, they can not part, unless air or some other, outside matter is allowed to penetrate between them.

"Still Better and More of It"

Here I have a pair of hemispheres, catalogued among scientific apparatus as cohesion hemispheres—and presumably admitted as such by science. What difference is there between these himspheres and those invented by Otto von Guerricke, any more than that the tension (cohesion) in the Magdeburg hemispheres may be made stronger by the suction applied through the air pump? Is it pressure in one case, and cohesion in the other?

What Obliging Pressure?

Here we have a small, leather disk, and a large piece of glass, or a marble slab, or almost anything with a smooth surface. I think, boys call this leather disk a "sucker." Being about two inches in diameter, its surface is about three square inches, and, if the pressure theory is correct, the pressure on it would be about fifty pounds. Let us suppose that the glass or slab is 12 by 18 inches, making a surface of 216 inches, multiplied by 15 pounds, equals 3,240 pounds pressure on it. Wetting the disk, you stick it on the slab, and lift by the string, when the 50 pounds pressure on the disk overcomes the 3,240 pounds pressure on the plate. Yet you are required to lift only the *weight* of the glass and disk and string. What becomes of the downward air pressure? It crawls under the plate and helps you—by its upward pressure—to lift the whole business up.



It is surely a delightful pressure! !

If it presses 15 pounds on the earth, why does it not press on the plate?

Because, in this phenomenon, it is cohesion, and not air pressure, that operates. Air pressure being "indisposed" or "otherwise engaged."

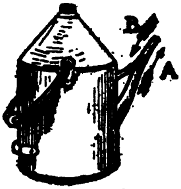
A Punctured Rubber Siphon

A prominent civil engineer asked me recently, if air pressure is not clearly proven, when a rubber siphon, becoming punctured, ceases to act as a siphon. That is: no longer lifting the water over an elevation. To him it may prove such a case, but to me it simply proves that, as water is of greater gravity than air; the puncture, allowing air to enter the tube above the water, the water finds a chance to seek its own

level, without being compelled, by the law prohibiting a vacuum, and by the law of cohesion, to drag water up hill after it, as before.

Oil Can Puzzle

I was asked: "Why can't oil come out of the oil can, without first unscrewing the tap and letting air in?"



Because of the law that all space must be filled with one substance or another; and, on account of the cohesion among the particles of oil.

With but a small nozzle—or with a large one, either, for that matter—the oil can not flow from the can, without, at the same time, allowing air to enter and fill the space previously occupied by the oil.

When the nozzle is very small; on account of the adhesion between the air and oil, the process is rendered more difficult. because the oil, through gravity, seeks to run out at the bottom of the nozzle, at A; while, to allow this, the air must simultaneously enter upward, at B. The friction caused by the contrary currents of the two fluids, makes the accomplishment of this almost impossible; therefore, to relieve the situation, you must let air in at the top or tap.

The cohesion in the oil, and its greater gravity, prevent air from entering; and, while air can not enter, oil can not descend. This applies to a keg, barrel, or any other vessel, under the same conditions.

Bleeding at High Altitudes

As a poser, I have often been asked: "What makes the blood run from one's nose when on a mountain, at a great altitude?" I do not know that blood does so run under the above conditions. At any rate, it can only happen after a great and sudden change to a much higher altitude. But, if it does, I should say it is as with the barometer—penetration and recession of foreign matter. The air being so much more rarefied, that it mixes more freely and to a larger extent with the blood; to such a degree that the blood vessels are overflowed.

Bleeding Effects of Caisson Work

Some time since, I saw an article in the "Scientific American," giving a minute description of the difficulties and danger attending the works in caissons. Stating that the laborers were often subject to severe bleeding, upon their return to the upper air.

The air, instead of pressing downward, as stated in Pneumatics, requires a great artificial force to push it downward below the level of the water, and to maintain it in the caissons. In spite of all that can be done, the most rarefied portion of the air exudes upward out of the caisson and out of the laborer's body, and his body is being filled with coarses matter from the bottom of the caisson; then, when after a few hours, the laborer reaches the upper air, an excessive amount of the most rarefied substances from this upper air, rushes in and fills his blood vessels to bursting, as also every pore of his flesh and bones. It is this spontaneous entering of foreign matter which causes the "caisson disease." This has been called by some medical men effervescence of the blood.

Air Bloated Deep Sea Fish

What there may be of reality in the alleged bloated appearance of the deep-sea fish, upon being brought to the air, is due—like all such cases—to the penetration of air into the flesh of the fish, being expanded thereby, and not—as claimed—to the relief from the pressure of the water.

WEIGHT OF THE AIR

I have often been asked: "Hasn't air weight?" This may be answered affirmatively or negatively: Affirmatively; because we know that air is material and has a *limited affinity towards* the earth's *surface.* But, Negatively—"with an overwhelming majority"—when we take weight to mean the mythical fifteen pounds to the square inch of atmospheric pressure.

The air's weight, attraction, or gravitation ceases when it reaches the level of a substance of greater gravity than itself—namely, the level of the sea. If every particle of matter possessed the *same* power of attraction for every other particle—or were acted upon in the same degree—a cubic foot of air would weigh as much as a cubic foot of gold, lead, or even thorium.

Air Filled Bottle

The air-filled bottle forced down to great depths of the water, is not broken by the pressure of the water, but by the great force exercised by the air to regain its own level.

The weights necessary to force the bottle down, give us a gentle intimation that air does not always press downward, but air puts in a very energetic struggle to go upward to its own level—hence, no pressure of the air!

Part of the air in the bottle (the most rarefied portion) because of its great and forcible tendency upwards, having exuded through the pores of the bottle, the remaining bulk of the air in the bottle contracts by cohesion and forces the bottle to collapse inward, letting the rest of the air escape back to its own level.

Just the *reverse* of being crushed *by pressure.*

Difficulties in Sounding

Here is another straw I have picked up by the wayside:

OCEAN 31,614 FEET DEEP.

"The hydrographic office has just issued a general chart showing the result of deep sea soundings taken by the United States navy in different parts of the world in the course of the last ten years. The greatest known depth of the sea is in the mid-Pacific ocean, and is recorded at 5269 fathoms—31,614 feet—or sixty-six feet short of six statute miles This sounding was obtained on the United States steamer Nero last year, and it is greater than any elevation on our continent, or, so far as known, in the world.

Last year the greatest depth in the Atlantic was found by the United States steamer Dolphin—4662 fathoms, or five and a quarter miles. The locality is some 300 miles northwest of the Azores islands. Previous to that the deepest known water in the Atlantic was 3828 fathoms, sounded in 1885 by Lieutenant S. P. Lee, with an ordinary lead of great weight"

If attraction or gravity is constant toward the center of the earth, why is this great increase in the weight of the lead necessary?

In my mind it shows the correctness of my contention; that gravity is limited, and that, at two or three times the above given depth even lead would cease sinking. I suppose that even the rope, in this case, must be metallic.

MICHAUD APPARATUS

With the permission of Prof. J. Fid Tristan, and with my anticipated thanks to him, I shall endeavor to illustrate through his apparatus my theory of the magnetic cohesion and adhesion of the particles of matter composing fluids. The said illustration was taken from the Scientific American of May 14th, 1904.

"Here is a little apparatus which, like Mariotte's bottle, can be used with success to demonstrate many laws. It can be made in a short time with ordinary laboratory implements, and has proved very useful in my class."

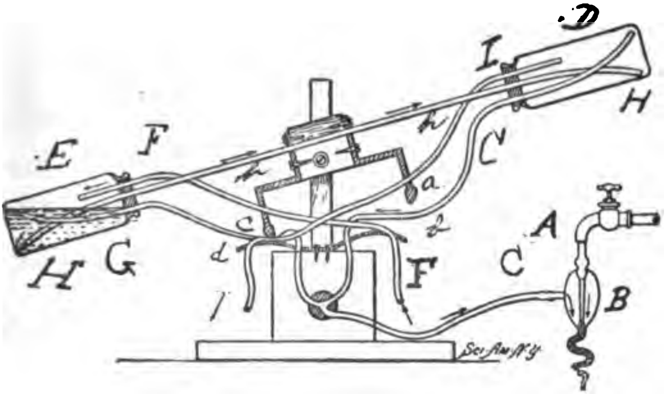
"Two bottles are employed, each provided with two flexible tubes, one serving to admit, and the other to exhaust air from the bottle. The bottles are connected by a main glass tube which is bent down at each end in the bottle as shown. This tube is mounted at the center in a wooden block pivoted between two arms of a standard. Two pieces of brass depend from this block and, as the apparatus oscillates, are adapted alternately to close certain of the flexible tubes by compressing them against a metal plate on the standard. The exhaust tubes of the bottles are connected to an aspirator, and one of the bottles is partly filled with water so as to tilt the apparatus to the position shown. In this position it will be observed that the exhaust tube of the lower bottle and the inlet tube of the upper bottle are both closed. Now, when water is turned on in the aspirator, a vacuum is produced in the upper bottle, and as the inlet tube of the lower bottle is free, water rises rapidly through the glass tube to the upper bottle. As this bottle slowly fills, it overbalances the other bottle and swings down to the lower position. The conditions are now reversed, and the same operations are repeated on the other side. About fifteen oscillations per minute are thus obtained."

"The principle of this apparatus was first made known by Gustave Michaud in the Scientific American of December 16, 1893. The apparatus illustrated is an improvement on Dr. Michaud's device, and is so modified as to provide a longer duration of oscillations."

If I had ordered this machine made expressly for my own and sole use, it could not have served my purpose better, to illustrate my theory of cohesion and adhesion.

An Improved Michaud Apparatus

By J. FID TRISTAN



(The lettering on the diagram is mine.)

The water from the faucet A, running through the bulb B, in its gravity downward, by Magnetic Cohesion and Adhesion, *pulls* air at the mouth of tube CC from the top of jar D. The tension thereby created in jar D is relieved by drawing water through tube H h h H into jar D, from the bottom of jar E; to relieve the tension now in jar E, caused by the drawing of water from jar E into jar D, air enters into jar E through tube FF, until jar D weighs more—contains more water, or has more gravity—than jar E, when the operation is reversed by jar D coming down and jar E rising to the top.

When jar D comes down, knob a comes down unto spring b and shuts off tube CC and tube FF, and knob c rises from spring d, relieving tube CG and tube II; then the water running through bulb B pulls air through tube CG from the top of jar E; to relieve the tension in jar E, water is pulled back from jar D, through tube H h h H; and, to relieve the tension in jar D air ascends into jar D through tube II, until jar E, by force of gravity again comes down, and the operation goes on again, as at first, and may continue doing so, back and forth, *ad infinitum.*

The very use of the word *aspirator,* in the above apparatus, proves that air is *pulled* from the jars, by suction (cohesion) and not by atmospheric pressure.

CONCLUSION

As life, matter, motion and force are ONE AND INSEPARABLE; as every particle of matter is a composition, an agglomeration, an accretion, of other particles; and, as the DIVISIBILITY of matter is INFINITE, so far as man's apprehension goes—when you have found the ULTIMATE INDIVISIBLE particle of matter which is not *itself an accretion,* of other particles—you will have found the the GREAT (yet rather small) FIRST CAUSE.

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